

CLAIMS

1. A material for use as self-lubricating sliding parts, which consists of a steel comprising, by mass, from not less than 0.4 % to less than 1.5 % of C (carbon), 0.1 to 3.0 % of Si, 0.1 to 3.0 % of Mn, from inclusive zero to 0.5 % of Cr, 0.05 to 3.0 % of Ni, 0.3 to 2.0 % of Al, 0.3 to 20 % in total (Mo + W + V) of at least one element selected from the group consisting of Mo, W (tungsten) and V (vanadium), and 0.05 to 3.0 % of Cu, wherein there can be observed graphite particles having an average particle size of not more than 3 μm in a section of the metal structure of the steel.
2. A material according to claim 1, wherein the graphite particles observed in the structural section occupy an area rate of not less than 1 % in the overall area of the structural section, and have an average particle size of not more than 3 μm .
3. A material according to any one of claims 1 and 2, wherein no vanadium carbides are observed in the structural section.
4. A material according to any one of claims 1 to 3, wherein the steel contains, by mass, 0.3 to 5.0 % in total (Mo + W) of at least one element selected from the group consisting of Mo and W, and less than 0.1 % of V.
5. A material according to any one of claims 1 to 4, wherein the steel contains, by mass, 0.7 to 2.0 % of Al.

6. A material according to any one of claims 1 to 5, wherein the steel contains, by mass, 1.5 to 3.0 % of Mo.

7. A material according to any one of claims 1 to 6, wherein the steel contains, by mass, not more than 10 % of Co.

8. A material according to any one of claims 1 to 7, wherein the steel contains, by mass, not more than 0.3 % of S (sulfur).

9. A material according to claim 8, wherein the steel further contains, by mass, not more than 0.01 % Ca.

10. A material according to any one of claims 1 to 9, wherein the steel has been subjected to nitriding treatment to use as sliding parts.

11. A wire material for use as piston rings, which consists of a steel comprising, by mass, from not less than 0.4 % to less than 1.5 % of C (carbon), 0.1 to 3.0 % of Si, 0.1 to 3.0 % of Mn, from inclusive zero to 0.5 % of Cr, 0.05 to 3.0 % of Ni, 0.3 to 2.0 % of Al, 0.3 to 20 % in total (Mo + W + V) of at least one element selected from the group consisting of Mo, W (tungsten) and V (vanadium), and 0.05 to 3.0 % of Cu, wherein there can be observed graphite particles having an average particle size of not more than 3 μm in a section of the metal structure of the steel, and wherein sulfide inclusions observed in the structural section, being parallel to the periphery of the piston

ring, are distributed such that straight lines each passing through a major axis of the respective sulfide inclusion cross one another within a cross angle of not more than 30 degrees which angle is referred to as a degree of parallelism.

12. A wire material according to claim 11, wherein graphite particles observed in a section of the metal structure occupy an area rate of not less than 1 % in the overall area of the structural section, and have an average particle size of not more than 3 μm .

13. A wire material according to any one of claims 11 and 12, wherein the steel contains, by mass, not more than 10 % of Co.

14. A wire material according to any one of claims 11 to 13, wherein the steel contains, by mass, not more than 0.3 % of S (sulfur).

15. A wire material according to claim 14, wherein the steel further contains, by mass, not more than 0.01 % of Ca.

16. A wire material according to any one of claims 11 to 15, wherein the steel has been subjected to nitriding treatment to use as piston rings.